MAENAD

EAST-ADL

Concept Presentation

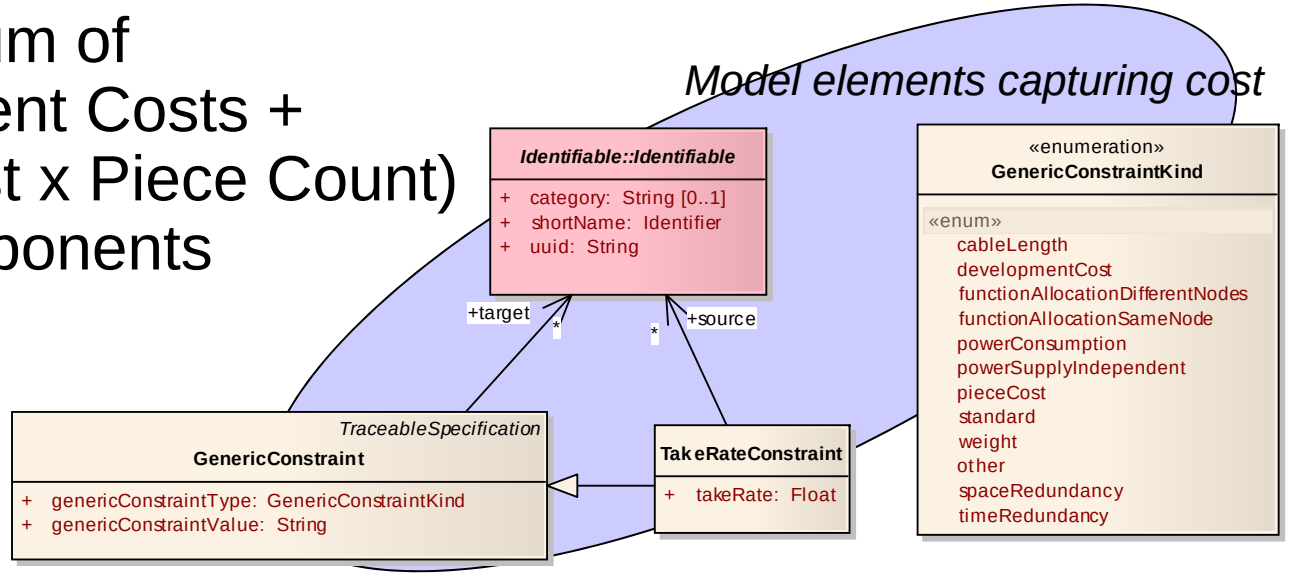
Analyses related to Fully Electrical Vehicles

Cost Estimation

Cost for a system, vehicle or product line is important for any assessment of a solution

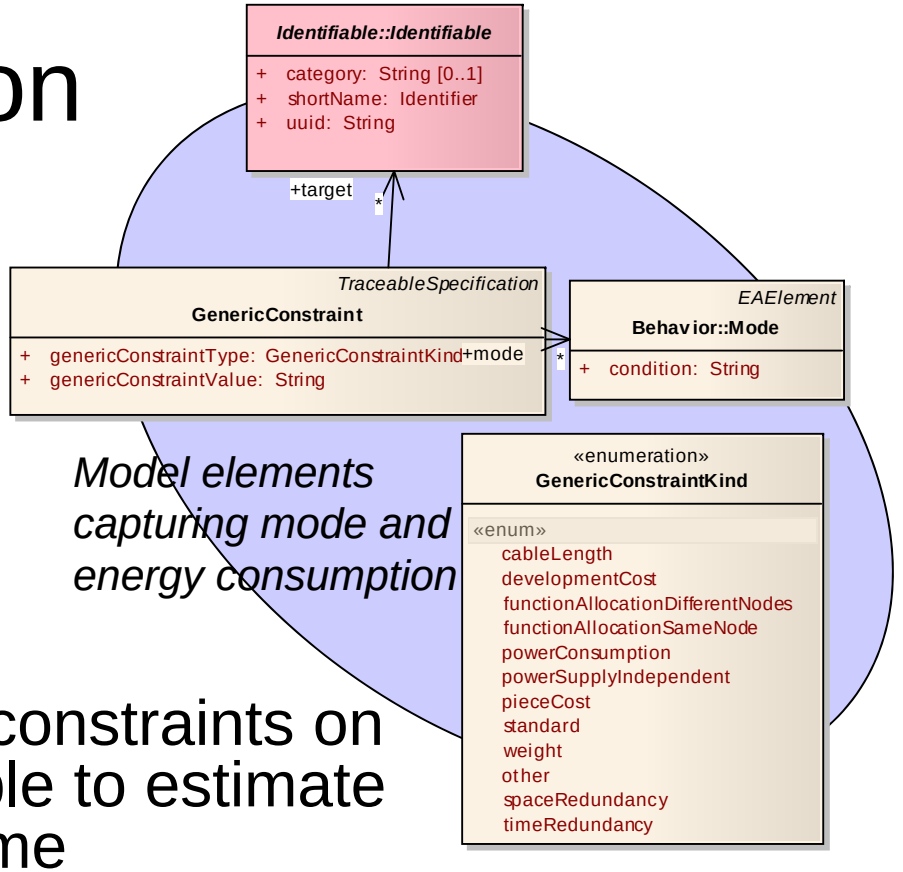
Component count and cost analysis can be done based on take rate constraint and the generic constraints piece cost and development cost.

Total Cost = Sum of
Development Costs +
(Piece Cost x Piece Count)
for all components



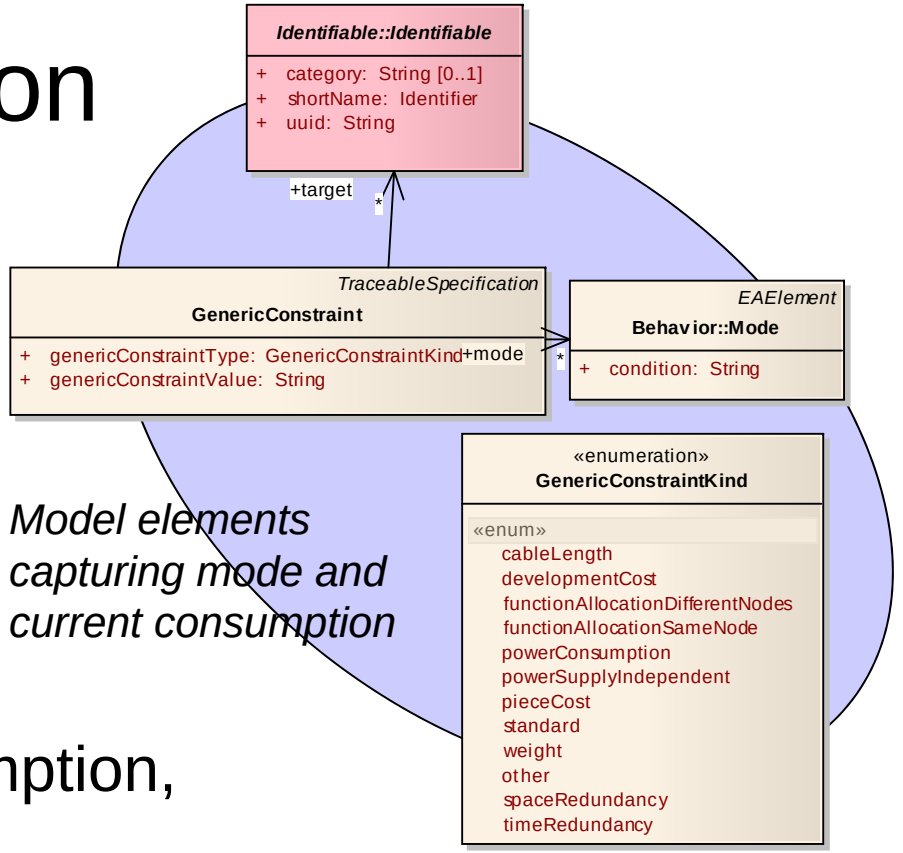
Energy Consumption

- Power Consumption is an important aspect of Electrical Vehicle Design
- Power Consumption can be estimated using powerConsumption constraints
- Combining with Behavioral constraints on how modes shift, it is possible to estimate energy consumption over time
- Alternatively, power consumption is linked to system signals, such as propulsion torque, cooling power, steering torque. Integration provides energy consumption over time.



Current Consumption

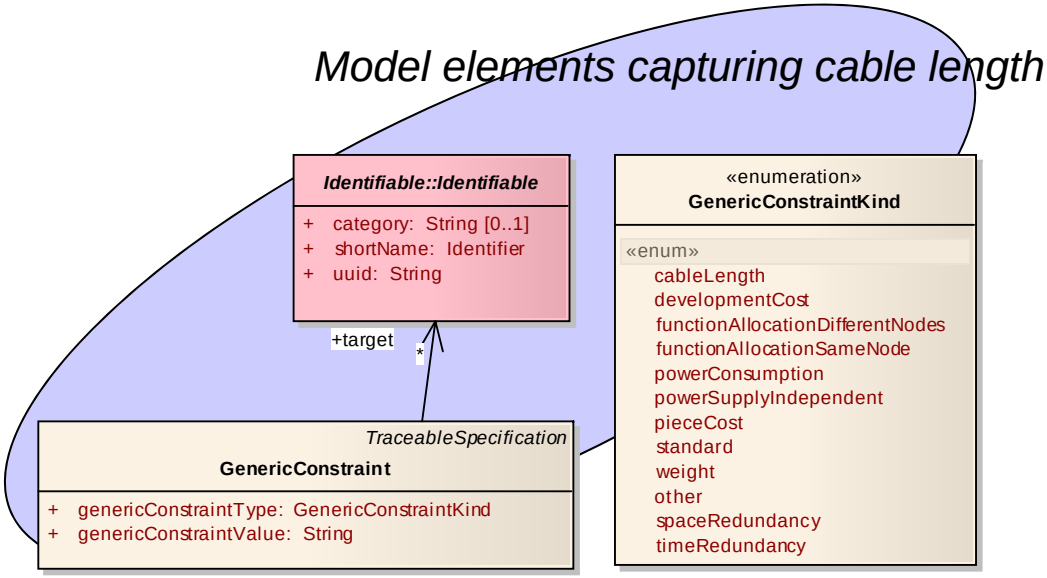
- Current assessment is used to check that cables are correctly dimensioned and that over-heating, EMI, etc. does not occur.
- Current consumption is assessed as Power Consumption, divided by voltage.
- As for Power, current can be assessed based on mode-dependent static constraints, or linked to system signals.



Model elements capturing mode and current consumption

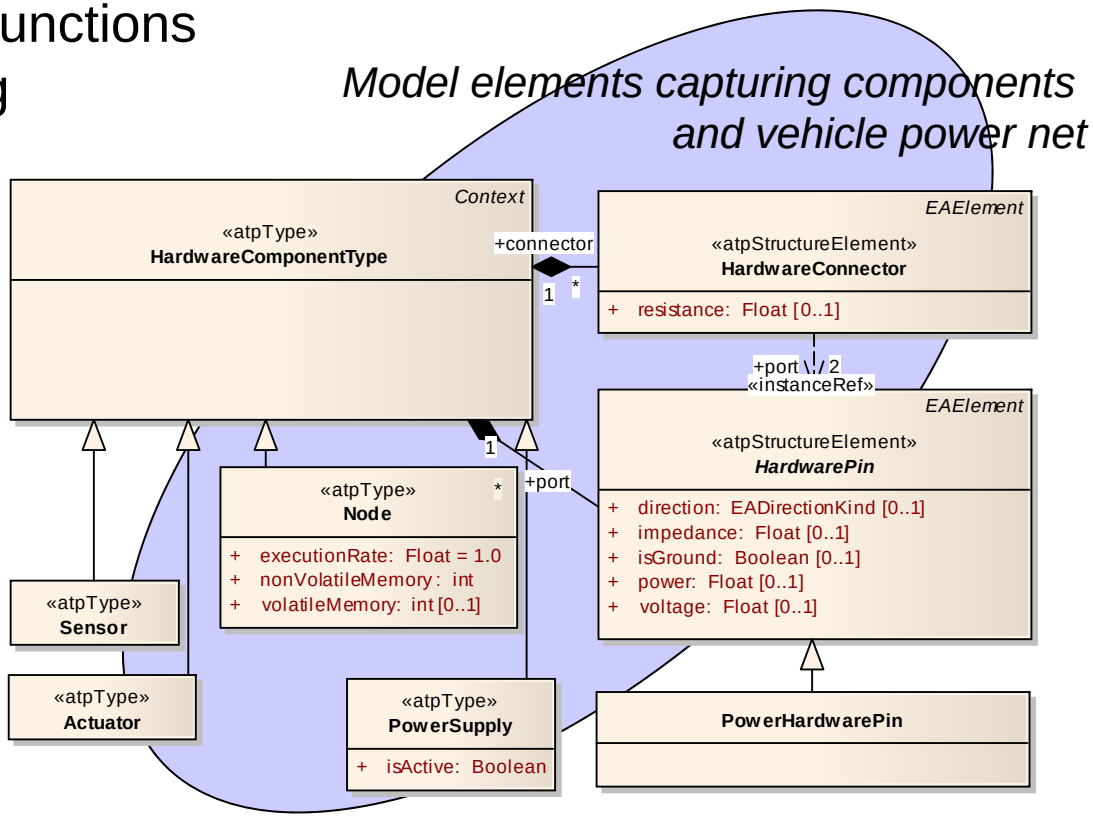
Cable Length

- Cable Length is a static measure that can be established after resolving all variabiliy and then summing the cable length constraints of the HardwareDesignArchitecture



Power Distribution Analysis

- Power distribution is critical as full-authority systems rely on electrical supply
- Features are Realized by functions allocated to HW. Analysing the power network makes it possible to assess which function is dependent on which power supply



Summary

- EAST-ADL supports model annotation for several aspects relevant for Electrical Vehicles
  - Cost
  - Cable length
  - Power
  - Current
  - Power distribution
- Analysis is generally based on simple arithmetics
- Variability resolution is an important step preparing analysis
- The proposed analyses are important ingredients in optimization